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the RAINBOW™

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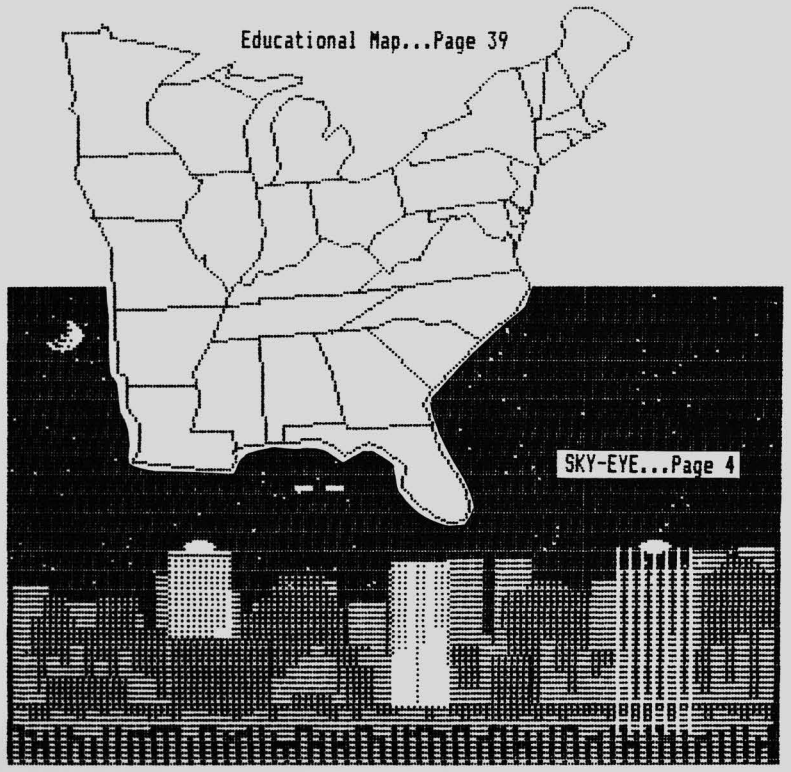
VOL. I NUMBER 9

The Monthly Magazine for Color Computer Users



UNDER the RAINBOW

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Do Your Taxes
Easier Animation
Disc Directory

Build A Desk
Educational Map
FRP Game Aids
Reviews

And...MUCH MORE!!

And...An EXCLUSIVE First Look At!

SPECTACULATOR!!

See Page 43

Editor's Notes...

PRINT #-2,

I think that the best single thing about being able to combine the computer and publishing business is the people we get to "meet." Now, understand that we have "met" none of them by this writing, and if we passed one another on the street we wouldn't even know it, but we have "met" one another all the same.

You may notice that we do not carry articles about the various software houses and the people who run them. That's not because we don't admire them -- one and all -- but it is simply because we think you'd rather we devote our space to things you can use -- programs, reviews, hints and tips -- than to saying how So-and-So Software came to be formed.

Still, I think there are a lot of great people out there, and I hope you'll let me bend your ear for a few moments for some observations about them...and the Color Computer business in general.

Ron Krebs of Mark Data Products and I were talking just the other day about one interesting point concerning the Color Computer: That is that darn few of the people who are writing software for CoCo are the same as those who wrote for the Model I (or the Apple, for that matter). The "big" names in micros -- people like Scott Adams, Dennis Kistz, Bill Barden -- are pretty much missing from the CoCo world.

They've been replaced by people like Ron, and Tom Mix, Joe Bennett, Howard Cohen, Dennis Lewandowski,

(Continued on Page 11)

LETTERS TO RAINBOW™

ELECTRIC NEWS

Editor:

I live in a country where the current is 220 volts/50 Hz. I have no difficulty stepping down to 110, but I'm stuck with 50 Hz. Before I left the U.S., I called Radio Shack and asked them if I could step down to 50 Hz. Their reply: It couldn't be done, I'd have to buy a European machine.

I thought I'd try it anyway, and I'm happy to say my CC is humming along with no difficulties, eating up its 110/50. (By the way, I force-cool my CC, I figure all the heat can't help it.)

Now the question: Would CC discs work on 50 Hz? How about Model I discs with the Exatron Interface?

Robert Morris
AmEmbassy Yaounde (USICA)
Department of State
Washington 20520

ROMPACK HELP

Editor:

What a timely surprise! After I installed my ECB ROM , the December issue of the RAINBOW arrived. My family enjoyed playing "Here Come The Vipers."

I usually enter AUDIO ON before I CSAVE a program so that I can "hear" the data being written. This alerts me when I don't press the record button.

Re ROMPACK BACKUP: I have found a much safer way that at least works with SPACE ASSAULT. Tape over the left ROM pin, insert the ROMPAK, then power up. You'll be in BASIC and then you can run the backup program.

An interesting variation to game packs is to load the taped-over cart, POKE to high-speed the computer, and then EXEC 49152. You may need 200ns memory to do this.

Cameron Price
Rockland, Ont.

RANDOM NUMBERS

Editor:

First of all, the RAINBOW is the only computer publication I read from cover to cover. Congradulations and keep up the good work.

About the Game Aids program. Random numbers are a lot easier to get than the method Mr. Urban has described.

In the example X=INT(RND(0)*10) to get a random number between 0 and 9, use X=RND(10)-1. As mentioned in the REM-DE-LEET program article, the more code there is, the longer it takes to process a program.

Douglas Elkins
Portland, ME

Editor:

I found the Game Aids article very interesting, but there is an error in the dice-throwing algorithm which I would like to correct. You presented the sequence for throwing three dice as:

```
X=RND(18)
```

However, this does not give the same result as throwing three dice. Your routine yields a number between 3 and 18, with any number having equal probability (which for the purpose it is being used is fine), but in a throw of three dice, while a number between 3 and 18 is produced, all do not have an equal probability of occurrance.

Rather, there is only one combination that will produce a 3 or an 18 (three 1's or three 6's) but there are 27 combinations that can form a 10 or 11 (for ten, 3, 1, 6; 4, 1, 5; 2, 2, 6; etc.). Altogether, there are 216 combinations of three dice. Therefore, the probability of throwing a 3 or an 18 is 1 in 216 (.0046%) whereas the chance for a 10 or 11 is 27 of 216 (or .125%). This makes a big difference in how the game runs if one has to throw an 18 as in Line 505. The easy way to correctly throw the dice is:

```
X=RND(6)+RND(6)+RND(6)
```

Of course, if equal probabilities between 3 and 18 are desired, the program runs fine as published.

Charles Styer
Tifton, GA

Editor:

You cannot simulate the roll of three dice by a random number between 3 and 18. The frequency distribution would be way off.

To simplify this, take the roll of two dice. The average frequency of 36 rolls would be:

Number	Frequency
2	1
3	2
4	3
5	4
6	5
7	6
8	5
9	4
10	3
11	2
12	1

A random number between 2 through 12 would give each the same average number.

Charles C. Worstell
Auburn, WA

NEEDS PROGRAMS

Editor:

I am especially interested in mortgage amoritization and income tax programs. Also, do you know of any programs that would allow me to file such things as recipies?

Olaf Johnson
Otis Orchards, WI

DOESN'T LIKE JUMPS

Editor:

Why do your articles have to skip forwards and backwards at random. Its like trying to work Rubik's Cube.

Reading is usually linear. BYTE sets a good example with no jumps in any direction.

Craig Cline
Cambridge, MA

(Eds. Note: We think the jumps make the pages look neater and, of course, can't fill empty pages with ads because we don't have quite (!) as many as does BYTE. We try to eliminate forward jumps, but...how many of you does this bother? We'll try to work on it.)

HIGH SPEED

Editor:

I recently asked for some help in getting my CC to run at high speed. You may recall I had no luck installing 2.0 MHz "B" series 6821 PIAs and 6809 MPU chips -- and in fact the fast 6809E made things worse.

Since then I managed to borrow a good scope and get Motorola's spec sheets on the 6809E, 6821 and -- most important -- the 6883 SAM chips.

The following may help others who have unsuccessfully gone the swap-the-chips route.

The only thing I found with the scope was very long and out of spec rise and fall times on the clock signals. To fix this I removed the two capacitators I had asked about in my letter. (These are designated C73 and C75 on the CoCo schematic). I still would like to know why they were put in in the first place.

With the capacitators removed, the clock signals squared up nicely and the computer ran in the high speed mode. It does with EITHER the 2.0 MHz chip or the original 1.0 MHz.

One reason for the ability to run at 1.8 MHz with 1.0 MHz rated chips is explained in the 6883 spec sheets. The command POKE 65495,"any number" puts the SAM in a two-speed mode. The speed is address-dependent. When addresses $0000 to $7FFF or $FF00 to $FF1F are selected, the clock rate is switched to the "standard" .89 MHz. When other addresses are selected, the clock automatically switches to the faster rate. In this mode, the clock is always switching between the two speeds, depending on what address is put on the address buss. The speed increase that we see is due to the great amount of time that the computer is in the high speed address areas -- where the BASIC ROMs and control functions are located.

The way the CoCo is memory mapped, all of RAM memory and the keyboard/joystick 6821 PIA are at the slow speed addresses. Changing the PIA chips will do no good. The same for RAM chips.

There are many possible solutions for a particular machine not working at 1.8 MHz, including a "slow" ROM but from what I found, I would try removing the capacitators first -- especially if a machine will run internally and only refuse to respond to the keyboard and joystick. Removing the capacitators costs nothing -- in fact, just try unsoldering one end of each.

The next thing would be to try a 2.0 MHz 68B09E or try swapping 6809E's with a machine that works and then try capacitator removal if necessary.

I would still like to hear of other solutions.

Rick Krankoski
Elk Grove Village, IL

LIKES RAINBOW

Editor:

When I subscribed to the RAINBOW I wasn't sure it would be worth the money. Now, after reading Wayne Green's editorial in the January, 1982, edition of 80-Micro about their coverage of the Color Computer, I am very happy I did.

Even though I didn't know about their editorial, when I received the RAINBOW and 80-Micro on the same day, I read RAINBOW first!!

Another note: Nelson Software has finally released their super color terminal program after many months. I don't know how many companies do this, but they seem to advertise their products and then develop the software. I don't know if RAINBOW checks their advertisers but I know this company does this. Their word processing program with disk I/O -- which has been advertised since October -- is still being developed.

James Gresham
Augusta, GA

(Ed. Note: We never knowingly allow advertising of products which are not available for sale and have been working on a program to insure you that you can be certain of this. No advertisments for this firm have appeared in the RAINBOW.)

ANOTHER SPEEDUP

Editor:

Maybe you are aware of yet another speedup of the CoCo.

Running the program FOR X=1 to 10000:NEXT:PRINT "END":END takes 22 seconds in normal mode and 16 with the "regular" speedup of POKE 65495,0.

When you POKE 65497,0 the runtime is reduced to 11 seconds. You POKE 65496,0 to recover.

The only drawback to this is that you lose complete control of the keyboard and screen until the second POKE, therefore it is good only for long calculations where you do not need the screen.

This speedup reduced the time it took to run CHROMASETTE's ROTATE program from about 15 minutes to about seven minutes.

By the way, can anyone tell me how you can get an automatic wraparound at 68 or 72 characters instead of the built-in 80 (printer) or 132 (CoCo)?

Edgar Poulin
Sherbrooke, Que.

"CANNED" ROUTINES

Editor:

Will someone explain (or, better, illustrate) how to implement the "canned" roputines found in the back of "Going Ahead With Color Basic"?

I have some knowledge of assembly language principles, but I can't get enough together to get these routines to work.

Ralph Coleman
Churchville, NY

Feature Game...

AYE, AYE, AYE - - - MY SKY EYE

That dynamic trio -- Illustrated Memory Banks, Drury High School and the RAINBOW -- bring you another exciting game for fun and frolic this month. Its called SKY-EYE and is the creation of Fred B. Scerbo, vice president and software author for IMB and another Drury High student, Robert Dobbert.

If you recall SNAIL INVADERS from the February issue, then you will remember the saga of Dale "Snail" Haggerty, who helped Scerbo with the graphics for that game. Not to be outdone, Dobbert, 16, got busy with SKY-EYE. He comments: "Making this was more fun than high school math!"

Among other things, SKY-EYE features an antimated title card which uses the text screen while the graphics screen paints the high-res game field. It also has a very rapid joystick control.

As with all software in the RAINBOW, you are authorized to make two copies of SKY-EYE for your personal use only. No part of this program may be reproduced or adapted for use with any other program.

Because it uses a speedup routine, do not try to run it until all program lines are entered. When you save it to tape, type POKE 65494,0: CSAVE "SKY-EYE" <ENTER>. If your computer hangs up on the PLAY and SOUND commands, eliminate all the POKEs in the program (lines 1, 87, 89, 91, 94 and 107). Note this program also gives four colors in PMODE 4,1.

The plot: SKY-EYE floats above the Big Apple, protecting its people from shooting stars which threaten the city. Use the right joystick to move SKY-EYE back and forth. The fire button will cause SKY-EYE to detonate.

If five shooting stars hit the city, it will be destroyed. Each destroyed shooting star earns 25 points.

* * * * * *

By the way, are there any other students out there writing programs? We would like to consider them for possible listing in the RAINBOW.

* * * * * *

The SKY-EYE Listing:

```
1 CLS0:CLEAR1200:POKE65495,0:DIM
A(14), P(13), P$(16):FORB=32TO22
4STEP16:A((B/16)-1)=B:NEXTB
2 M$(2)="6":N1=-16:N3=256:FORK=1
TO16:N1=N1+16:N3=N3-16:M$(1)=STR
$(N1):M$(3)=STR$(N3)
3 P$(K)="C0R"+M$(1)+"C5R"+M$(2)+
"C0R4C5R"+M$(2)+"C0R"+M$(3)+"UL"
+M$(3)+"C5L"+M$(2)+"C0L4C5L"+M$(
2)+"C0L"+M$(1):NEXTK
4 SR=3:C=3:P$=CHR$(128):FORI=2TO
14:FORJ=4TO13:SET(J,I,C):NEXTJ:N
EXTI
5 FORK=0TO11STEP11:FORJ=18TO23:S
ET(J+K,2,C):NEXTJ:FORJ=17TO24:SE
T(J+K,3,C):NEXTJ:FORI=4TO14:FORJ
=16TO25:SET(J+K,I,C):NEXTJ:NEXTI
:NEXTK
6 FORK=0TO7STEP7:FORJ=39TO58:FOR
I=2TO7:SET(J,I+K,C):NEXTI:NEXTJ:
FORI=3TO6:SET(59,I+K,C):NEXTI:FO
RI=4TO5:SET(60,I+K,C):NEXTI:NEXT
K
7 PRINT@257,P$;:FORY=1TO28:READA
:PRINTCHR$(A);:NEXT
8 DATA105,108,108,117,115,116,11
4,97,116,101,100,128,128,128,109
,101,109,111,114,121,128,128,128
,98,97,110,107,115
9 PRINT@329,P$;:FORY=1TO12:READA
:PRINTCHR$(A);:NEXT
10 DATA98,111,110,117,115,128,12
8,128,103,97,109,101
```


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```
11 PRINT@399,CHR$(98)+CHR$(121);
12 PRINT@447,P$;:FORY=1TO32:READ
A:PRINTCHR$(A);:NEXT:GOTO43
13 DATA102,114,101,100,128,115,9
9,101,114,98,111,128,128,97,110,
100,128,128,114,111,98,101,114,1
16,128,100,111,98,98,101,114,116
14 IFM1=0THEN26ELSEIFM1=1THEN27E
LSEIFM1=2THEN28ELSEIFM1=3THEN29E
LSEIFM1=>4THEN30
15 L1=M2:GOSUB31:MC$=LL$:IFM2=>1
0THENM3=M3+1
16 IFM2=>10THENM2=0
17 L1=M3:GOSUB31:MD$=LL$:IFM3=>1
0THENM4=M4+1
18 IFM3=>10THENM3=0
19 L1=M4:GOSUB31:ME$=LL$:IFM4=>1
0THENM5=M5+1
20 IFM4=>10THENM4=0
21 L1=M5:GOSUB31:MF$=LL$:IFM5=>1
0THENM6=M6+1
22 IFM5=>10THENM5=0
23 IFM6=>10THENM6=0
24 L1=M6:GOSUB31:MG$=LL$
25 RETURN
26 MA$=J$:MB$=J$:GOTO15
27 MA$=B$:MB$=E$:GOTO15
28 MA$=E$:MB$=J$:GOTO15
29 MA$=G$:MB$=E$:GOTO15
30 MA$=J$:MB$=J$:M1=0:M2=M2+1:GO
TO15
31 IFL1=0THEN32ELSEIFL1=1THEN33E
LSEIFL1=2THEN34ELSEIFL1=3THEN35E
LSEIFL1=4THEN36ELSEIFL1=5THEN37E
LSEIFL1=6THEN38ELSEIFL1=7THEN39E
LSEIFL1=8THEN40ELSEIFL1=9THEN41E
LSEIFL1=>10THEN42
32 LL$=J$:RETURN
33 LL$=A$:RETURN
34 LL$=B$:RETURN
35 LL$=C$:RETURN
36 LL$=D$:RETURN
37 LL$=E$:RETURN
38 LL$=F$:RETURN
39 LL$=G$:RETURN
40 LL$=H$:RETURN
41 LL$=I$:RETURN
42 LL$=J$:RETURN
43 PMODE3,1:PCLS(5):SCREEN0,0
44 A$="BR3NU4BR2":B$="BR2U2R3U2N
L3BD4NL3":C$="BR2R3U2NL2U2NL3BD4
":D$="BR2BU2NU2R3U2D4":E$="BR2R3
U2L3U2R3BD4":F$="BR2U4NR3D2R3D2N
L3":G$="BR2BU3UR3D4":H$="BR2U4R3
D2NL3D2NL3":I$="BR2BU2NR3U2R3D4"
:J$="BR2U4R3D4NL3":Q$="C5BRNU4RU
4RD4RU4RD4RU4RNL4D2NL4D2L6C0
45 PCLS(5):PMODE3,1:PCLS(5):SCRE
EN0,0
46 LINE(0,160)-(256,192),PSET,BF
47 PMODE4,1:SCREEN0,0:FORI=2TO25
6STEP16:LINE(I,126-RND(30))-(I+1
1,180),PSET,BF:NEXT:PMODE3,1:SCR
EEN0,0
48 DRAW"S8BM0,134:C2R4U6R2U4R3D2
RD2RD2R4U6R6D6R6U13R9D13R3U3R3U3
R2U2RU2R7D2RD2RD2RD7R8U13E2R6F2D
13R9U8E2R2E2R2F2R2F2D9R5U15R11D1
5R3U14R2E3R2F3R2D14R2D14L180"
49 PAINT(20,136),2,2
50 PMODE4,1:SCREEN0,0:FORI=2TO25
6STEP4:LINE(I,156-RND(30))-(I+2,
180),PSET,BF:NEXT:PMODE3,1:SCREE
N0,0
51 CLS0:FORV=3TO9STEP3:FORH=0TO7
:SET(H,V,5):NEXTH,V
52 FORH=3TO6:SET(0,H,5):SET(1,H,
5):NEXTH:FORH=6TO9:SET(6,H,5):SE
T(7,H,5):NEXTH
53 FORH=3TO9:SET(10,H,5):SET(11,
H,5):NEXTH
54 FORH=12TO17:SET(H,6,5):NEXT
55 FORV=3TO6:SET(18,V,5):SET(17,
V,5):NEXT
56 FORV=7TO9:SET(14,V,5):SET(15,
V,5):NEXT
57 FORH=16TO18:SET(H,9,5):NEXT:G
OTO61
58 FORV=3TO6:SET(22+L,V,5):SET(2
3+L,V,5):NEXT
59 FORV=3TO9:SET(28+L,V,5):SET(2
9+L,V,5):NEXT
60 FORV=6TO9STEP3:FORH=22TO29:SE
T(H+L,V,5):NEXTH,V:RETURN
61 GOSUB58:FORH=33TO36:SET(H,6,5
):NEXT
62 GOTO64
63 FORV=3TO9STEP3:FORH=40TO45:SE
T(H+L,V,5):NEXTH,V:FORV=3TO9:SET
(41+L,V,5):SET(40+L,V,5):NEXTV:R
ETURN
64 GOSUB63:L=26:GOSUB58:L=18:GOS
UB63
65 FORI=0TO63:SET(I,31,7):NEXTI:
FORL=0TO24STEP8:FORI=0TO224STEP3
2:PRINT@257+L+I,STRING$(5,142+LL
)+CHR$(138+LL);:NEXTI:LL=LL+16:N
EXTL:GOSUB66:GOSUB66:GOTO67
66 FORXW=1TO4:PRINT@192+EW,CHR$(
128)+CHR$(204)+CHR$(204)+CHR$(12
8)+CHR$(204)+CHR$(204);:EW=EW+1:
NEXT:RETURN
67 COLOR2,3:LINE(0,155)-(256,162
),PRESET,BF
68 LINE(12,145)-(38,162),PRESET,
BF:LINE(55,130)-(86,162),PRESET,
BF:LINE(94,150)-(106,162),PRESET
,BF:LINE(113,140)-(120,162),PRES
ET,BF:LINE(160,136)-(172,162),PR
ESET,BF
69 GOSUB66:PMODE4,1:SCREEN0,0:FO
RI=2TO256STEP4:LINE(I,162-RND(6)
)-(I+3,180),PSET,BF:NEXT:PMODE3,
1:SCREEN0,0
70 LINE(0,0)-(256,176),PRESET,B
71 FORI=0TO256STEP4:LINE(I,170-R
ND(8))-(I+4,176),PRESET,B:NEXT
72 GOSUB66:FORI=70TO176STEP2:LIN
E(0,I)-(256,I),PRESET:NEXT
```

(Continued on Page 6)

SKY-EYE (Cont'd from Pg. 5)

```
 73 H=0:PMODE4,1:SCREEN0,0:FORI=1
TO8STEP2:H=H+1:CIRCLE(22-H,18),I
,5,.9,.8,.4:NEXT
 74 GOSUB66:FORI=1TO150:PSET(RND(
256),RND(110)):NEXT:SCREEN0,0
 75 FORI=2TO26STEP4:LINE(200+I,97
)-(200+I,164),PSET:NEXT
 76 GOSUB66:FORI=2TO54STEP2:LINE(
128,100+I)-(146,100+I),PSET:NEXT
 77 FORI=131TO143STEP3:LINE(I,102
)-(I,154),PSET:NEXT
 78 FORI=98TO128STEP2:LINE(54,I)-
(74,I),PSET:NEXT
 79 FORK=0TO150STEP150:FORI=1TO5:
CIRCLE(64+K,96),I,5,.5,1:NEXTI:N
EXTK
 80 GOSUB106:CLS0:SCREEN1,1
 81 COLOR5,0
 82 E=RND(9)+2
 83 H=RND(2):IF H=1 THEN BD=(+4)
ELSEIF H=2THEN BD=(-4)
 84 GOSUB101:D=D+10:F=F+BD:SCREEN
1,1:IFD=>110THEN91
 85 GOSUB101
 86 LINE(A(E),0)-(A(E)+F,D),PSET:
IFW=0THEN90
 87 POKE65494,0:PLAY"V31T25502GBC
":POKE65495,0:FORJ=5TO11STEP3:CI
RCLE((Y*16)-9,75),J,5,.9:NEXTJ:F
ORJ=5TO12:CIRCLE((Y*16)-9,75),J,
0,.9:NEXTJ:W=0
 88 IFPPOINT(A(E)+F,D)=5THEN90
 89 FORP=1TO3:GOSUB105:POKE65494,
0:PLAY"V31L25502BC":POKE65495,0:
NEXTP:COLOR0,0:LINE(A(E),0)-(A(E
)+F,D),PRESET:COLOR5,0:D=0:F=0:M
1=M1+1:GOSUB106:GOTO82
 90 GOTO84
 91 DRAW"S4BM0,75;C0R255UL255":CO
LOR0,0:LINE(A(E),0)-(A(E)+F,D),P
RESET:COLOR5,0:D=110:FORYY=6TO30
STEP8:CIRCLE(A(E)+F,D),YY,1,.8:N
EXTYY:FORYY=2TO30:CIRCLE(A(E)+F,
D),YY,0,.8:NEXTYY:POKE65494,0:PL
AY"T255L30V3101DCDC":POKE65495,0
:GOSUB101:D=0:F=0
 92 EC=EC+1:CIRCLE(100+(25*EC),18
4),5,0,.7:IFEC=5THEN107ELSE82
 93 FORI=1TO212STEP8
 94 PLAY"V3101L55C":PUT(219-I,30)
-(256-I,44),H,PSET
 95 PSET(63,90-Q,0):PSET(64,90-Q,
0):Q=Q+13:IFQ=>82THENQ=0:PSET(64
,90-Q,5):PSET(63,90-Q,5)
 96 PSET(63,90-Q,5):PSET(64,90-Q,
5)
 97 IFI=>209THEN LINE(219-I,30)-(
256-I,44),PRESET,BF
 98 NEXTI
 99 GOTO93
100 GOTO100
101 Z=JOYSTK(0)+4:Y=INT(Z/4):DRA
W"S4BM0,75;"+P$(Y):COLOR5,0:IFW=
1THENRETURN
102 IFPEEK(65280)=126THEN103ELSE
IFPEEK(65280)=254THEN103ELSERETU
RN
103 IFW=1THENRETURN
104 W=1:RETURN
105 PMODE3,1:SCREEN1,1:FORI=1TO5
0:NEXTI:PMODE4,1:SCREEN1,1:RETUR
N
106 GOSUB14:DRAW"S8BM20,188;"+Q$
+MG$+Q$+MF$+Q$:DRAWME$+Q$+MD$+Q$
:DRAWMC$+Q$+MA$+Q$+MB$:RETURN
107 PMODE3,1:POKE65494,0:SOUND22
0,5:POKE65495,0:FORI=2TO192STEP6
:SCREEN1,1:CIRCLE(126,92),I,,.7:
SCREEN1,0:CIRCLE(126,92),I+3,,.7
:NEXT:POKE65494,0:FORI=1TO20:PLA
Y"O1L10BC":NEXT:RUN
108 ' "SKY-EYE" BY FRED B.SCERBO
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EXCITING NEWS FOR COLOR COMPUTER USERS

FLEX, OS-9 and the Radio Shack Disk System ALL on the SAME Color Computer

Would you believe that you can run FLEX, OS-9 and Radio Shack disk software on the same Color Computer, and all you have to do is change the disk? That's right, just change the disk. If you have a 32K Color Computer with the Radio Shack disk system, all you need to do is make a trivial modification to access the hidden 32K, as described in the Feb issue of COLOR COMPUTER NEWS and the March issue of '68' Micro. You can get FLEX from us right now. OS-9 will be ready by summer. Please note that this will only work with the Radio Shack disk system and 32K/64K memory chips that RS calls 32K. Maybe they put 64K's in yours, too. If you don't have a copy of the article, send a SASE and we'll send it to you.

Using this system to run FLEX and OS-9 has many advantages. First, it gives you 48K from zero right up to FLEX. This means that *ALL* FLEX compatible software will run with *NO MODIFICATIONS* and *NO PATCHES!* There are no memory conflicts because we moved the screen up above FLEX which leaves the lower 48K free for user programs.

What you end up with is 48K for user programs, 8K for FLEX and another 8K above FLEX for the screens and stuff. We are working on a multi screen format so you can page backward to see what scrolled by and a Hi-Res screen that will enable us to have 24 lines by 42 character display. That's better than an Apple!

We also implemented a full function keyboard, with a control key and escape key. All ASCII codes can now be generated from the Color Computer keyboard!

We also added some bells and whistles to Radio Shack's Disk system when you're running FLEX or OS-9. We are supporting single or double sided, single or double density, 35, 40 and 80 track drives. If you use double sided drives, the maximum is three drives because we use the drive 3 select for side select. When you are running the Radio Shack disk, it will work with the double sided drives but it will only use one side and only 35 tracks. Using 80 track drives is okay, but will not be compatible with standard Radio Shack software. You can also set each drive's stepping rate and drive type. (SS or DS - SD or DD)

In case you don't understand how this works, I'll give you a brief explanation. The Color Computer was designed so that the roms in the system could be turned off under software control. In a normal Color Computer this would only make it go away. However, if you put a program in memory to do something first (like boot in FLEX or OS-9), when you turn off the roms, you will have a full *64K RAM* System with which to run your program (FLEX or OS-9). When the roms are turned off, it is as if you had removed them from the computer. They are gone!

Now, we need the other half of the 64K ram chips to work, and this seems to be the case most of the time, as the article states. Of course, you could also put 64K chips in.

We decided that this was the best way to run FLEX and OS-9 on the Color Computer because it does remove the roms from the memory map and leaves the full 48K for user programs. If you just put in memory for FLEX and use the Basic hooks for I/O, all you have is a little over 30K for user programs. In addition, very few FLEX programs will run without being modified and some won't run very well, if at all (our DATAMAN + for example). Let me state it again. ALL FLEX COMPATIBLE PROGRAMS WILL RUN WITHOUT MODIFICATION!!! and the same goes for OS-9!

It is also the ONLY way OS-9 will run because 30K is just not enough.

Some neat utilities are included.

MOVEROM moves Color Basic from ROM to RAM. Because it's moved to RAM you can not only access it from FLEX, you can run it and even change it!! You can load Color Comuter cassette software and save it to FLEX disk. Single Drive Copy, Format and Setup commands are also included.

If you don't have a Color Computer, we can sell you one complete with 64K ram, 24K rom, Single RS disk drive and FLEX for only $1,490, set up and ready to go.

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My Own Money #3...

DO YOUR TAXES ON YOUR COCO

By Lawrence C. Falk

This is the third and last part of our vaunted MOM series (Managing Your Money). You'll recall we balanced checkbooks in January, showed you how to organize your deductions in February and now, with tax time approaching, we'll present a simple way to get a reading on your income tax return.

TAXTAB is basically designed to run with last month's program. While it does handle the major items in the IRS' 1040 and itemized deductions, it is not all-inclusive. However, the program is, as you will see below, so simple that modifications are pretty easy to handle.

The formatting here isn't too fancy, because we suspect what is really important is the bottom line: How much tax you either owe or what sort of refund you'll get back. There is also a printer routine, beginning with Line 700. Its geared for the LP VII, but can easily be changed with one control code adjustment in that line. If you are printerless, no need to enter lines past 610. The final display fits on one screen.

For those of you with more complicated taxes, it is fairly simple to add lines to accomodate these items. Just follow the 1040 Form and make adjustments to the algorithms for adding and subtracting to and from Adjusted Gross Income.

We used this program to figure preliminary taxes a year ago before giving the basic information to our CPA. It came to within $100 of being right, and the CPA cost more than that. Of course, we cannot guarantee the suitability of it to your needs.

Minor adjustments have been made to take changes in this year's 1040 into account.

The Listing:

```
1 '*************************
2 '***       TAXTAB        ***
3 '*** (c) FALSOFT 1980 ***
4 '*************************
10 INPUT "WAGES";W
20 INPUT "INTEREST EARNED";EA
30 INPUT "DIVIDENDS";D
40 INPUT "OTHER INCOME";OI
```


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TAG: 2 player game of chase Fast action and fun	10.95

16K Color BASIC Programs

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BLACKBOX: Find the hidden points by probing the blackbox with a projectile-a challenging game of deductive reasoning	9 95
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AUTO MINDER: Keep track of fuel usage tune-ups oil changes etc creates and maintains cassette data files for multiple autos	10 95

16K Ext. Color BASIC Programs

FURLONG DERBY: A horse of a different color racing game for 1 to 3 players	$ 9 95
ESCAPE: Intermediate adventure with GRAPHICS The player must find and decipher various clues to escape Graphics give player the feel of being there	15 95
SASPUS: Beginner's adventure game—the player must find and destroy the deadly mutant in a genetic nuclear research center Each game is randomized	8 95
PIRATE TREASURE: Advanced beginner's adventure—the player must find the pirate's treasure which is hidden in a cave of over 40 rooms	11 95
ADVENTURE COMBO: Combination of SASPUS and PIRATE TREASURE	16 95
FLIPUM: Color computer version of the OTHELLO** type games	9 95
FLIGHT SIMULATOR: Fly to the airport with instruments only (joysticks req'd) The player can set difficulty to challenge his flight experience	11 95
PEEK 'N' SPELL: Flashes word or letter on screen for children's spelling drill— New word files can be created and stored on cassette tape	10 95
CAPITALS COMBO: Name the capitals drill for the United States Americas Africa Europe Asia and Mid East Asia	25 95
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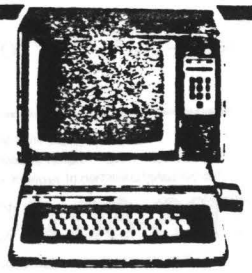
```
50 TI=W+EA+D+OI
60 PRINT "TOTAL INCOME" TI
70 INPUT "TAX REFUNDS";TR
80 INPUT "EMPLOYEE BUSINESS EXPE
NSE";EB
90 AG=TI+TR-EB
100 PRINT "ADJUSTED GROSS INCOME
"AG
105 OP=AG*.01:TP=AG*.03
107 OP=INT((OP+.005)*100)/100:TP
=INT((JP+.005)*100)/100
110 INPUT "HALF (BUT NOT MORE TH
AN $150)      OF MEDICAL INSURANC
E PREMIUMS    YOU PAID";MI
120 INPUT "COST OF MEDICINE AND
DRUGS";ME
130 MA=ME-OP
135 IF MA<0 THEN MA=0
140 INPUT "BALANCE OF MEDICAL IN
SURANCE       PREMIUMS";BI
150 INPUT "OTHER MEDICAL EXPENSE
S";OM
160 MZ=MA+BI+OM:MY=MZ-TP
170 IF MY<0 THEN MY=0
180 MD=MY+MI
190 INPUT "STATE TAXES";ST
200 INPUT "LOCAL TAXES";LT
210 INPUT "REAL ESTATE TAXES";RE
220 INPUT "SALES TAXES (FROM TAB
LE";UT
230 INPUT "EXTRA SALES TAXES (CA
R)";ES
240 TD=ST+LT+RE+UT+ES
250 INPUT "HOME MORTGAGE";IH
260 INPUT "CONSUMER CREDIT INTER
EST";IC
270 INPUT "AUTO INTEREST";AI
280 ID=IH+IC+AI
290 INPUT "CASH CONTRIBUTIONS";C
C
300 INPUT "NON-CASH CONTRIBUTION
S";NC
310 CD=CC+NC
350 INPUT "MISC. DEDUCTIONS";VD
360 FD=MD+TD+ID+CD+VD
370 INPUT "NUMBER OF EXEMPTIONS"
;SB
380 SY=SB*1000
390 QQ=AG-FD-SY
430 PRINT "  NOW, GO TO THE TAX
TABLE AND  FIND THE TAX ON"QQ
432 INPUT "  ENTER IT HERE";IT
440 INPUT "  AMOUNT WITHHELD";AW
450 JJ=IT-AW
460 PRINT:PRINT "  YOU GET A REF
UND OF"JJ
470 PRINT:INPUT "FOR A RUNDOWN,
HIT <ENTER>";BB
480 CLS
490 PRINT "YOUR INCOME";TAB(22)A
G
500 PRINT "LESS DEDUCTIONS OF:"
510 PRINT " MEDICAL";TAB(14)MD
520 PRINT " TAXES";TAB(14)TD
530 PRINT " INTEREST";TAB(14)ID
540 PRINT " CONTRIBS";TAB(14)CD
```

(Continued on Page 10)

CO-RESIDENT EDITOR/ASSEMBLER (CORES9)



CORES9 is a complete full function editor/assembler package that will allow you to create, edit and assemble 6809 machine language programs for the color computer. It features a powerful full function text editor and supports the entire 6809 instruction set with all addressing modes, forward and reverse lable references, will output object code directly to memory or "CLOADM" compatible tapes and much more.

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TEXT EDITOR

This program is a line/character oriented text editor for the color computer, that will enable you to create and edit text files for Basic programs, letters, text data files, or almost anything you might want to put on paper. It features functions for adding, inserting, deleting, moving and copying text lines or paragraphs; powerful string search and replace commands, single and automatic line numbers and line editing with 9 sub commands to insert, delete, change, add and remove individual or mutiple characters. Tape commands allow you to save, load, append, and skip tape files; also it is compatible with Basic ASCII tape formats. A MUST HAVE PROGRAM!!

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TAX (Cont'd from Pg. 9)

```
550 PRINT " MISC.";TAB(14)VD
560 PRINT "TOTAL DEDUCTS";TAB(22
)FD
570 PRINT "LESS EXEMPTIONS";TAB(
22);SY
580 PRINT "TAXABLE AMOUNT";TAB(2
2)QQ
590 PRINT " TAX OWED";TAB(22)IT
600 PRINT " LESS WITHHOLDING";TA
B(22)AW
610 PRINT "R E F U N D";TAB(22);
JJ
690 INPUT "PRINT THIS OUT";YN$
695 IF YN$="N" OR YN$="NO" THEN
END
700 PRINT#-2,CHR$(15)"  TAX SUMM
ARY"
710 PRINT#-2,"YOUR INCOME";TAB(2
2)AG
720 PRINT#-2,"--LESS DEDUCTIONS
OF:"
730 PRINT#-2," MEDICAL";TAB(14)M
D
740 PRINT#-2," TAXES";TAB(14)TD
750 PRINT#-2," INTEREST";TAB(14)
ID
760 PRINT#-2," CONTRIBS";TAB(14)
CD
770 PRINT#-2," MISC.";TAB(14)VD
780 PRINT#-2,"TOTAL DEDUCTS";TAB
(22)FD
790 PRINT#-2,"EXEMPTIONS";TAB(22
)SY
800 PRINT#-2,"TAXABLE AMOUNT";TA
B(22)QQ
810 PRINT#-2," TAX OWED";TAB(22)
IT
820 PRINT#-2," LESS WITHHOLDING"
;TAB(22)AW
830 PRINT#-2," R E F U N D";TAB(
22)JJ
840 END
```


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Lawrence C. Falk -- Editor

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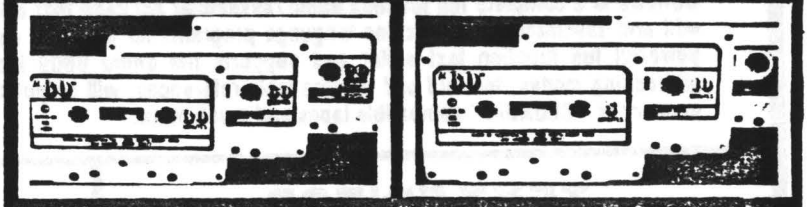

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Dave Hooper, Kathy Goebel, John Waclo, Bill Dye, Wayne Diercks, Gary Davis, Tom Rosenbaum and Fred Scerbo. Add a dash of the people who have been active in 6809 before CoCo made it really popular, like Sue Searby, Frank Hogg and Bill Vergona, and you have a whole new breed of people whose names you will come to know in the near future.

Those people, and some who have led the conversion to CoCo like Bob Rosen, Frank Brandon, Syd Kahn, Dave Lagerquist and Roger Olsen, make up the Color Computer world right now. These people, and a bunch of others space doesn't permit me to name, are the new Adams' and Bardens of Color Computing. A year from now, their names on a program will sell it to you just as surely as Adams' does on a Model III Adventure today.

I was thinking about this just the other day when I received a letter from Steve Blyn, who has just started a software business. He has some nice programs for children and I was mentioning them to a friend here in Kentucky. The friend replied, "Who's this? Is that Dorsett Educational?" Dorsett, of course, supplies a great deal of Apple educational software.

As I replied to the friend, I couldn't help but think there is no real good reason why Steve and Cheryl Blyn won't be bigger than Dorsett some day. After all, they have a better computer to use in programming their talents.

We've been fortunate enough to meet a lot of fine people so far in this enterprise. Not just the people who write programs, but the people who sell them, and the people who buy them -- and the RAINBOW. We really enjoy hearing from you and we hope you'll call on us for help, information or advice whenever you think we might be of assistance.

* * * * * *

You may notice an advertisment in this month's issue for Color Computer News. Its the only other publication devoted exclusively to the Color Computer. Frankly, we feel there is adequate room in the CoCo world for both the RAINBOW and for CCN. And we know Bill Sias, the editor, agrees. An ad for the RAINBOW will also appear in CCN. Its my opinion that both of us are trying to put out a good product that merits your support and will be helpful to you.

* * * * * *

Credit where credit is due department this month appropriately goes to intrepid Dave Lagerquist of Chromasette for the name CoCo. You'll notice we use it pretty liberally in the RAINBOW. For one thing, it seems to fit. And for another, it saves us some space.

* * * * * *

You'll notice we're even fatter and a little fancier again this month. We hope you enjoy the additional information we are now able to provide -- thanks to advertising which holds the cost of printing and mailing down.

Speaking of mailing, we DO mail the RAINBOW each month on or a little after the first of the month that is printed on page one. It may take a couple of weeks for bulk mail to get your issue to you. If you've not received your copy by the 20th, send us a card and we'll hustle another out to you by first class mail.

Until April...Geoffery Chaucer's favorite month. Would anyone like to submit a program called "Canterbury Adventure?"

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MAKE YOUR REMS STAND OUT

By Gary A. Davis

In order to maintain and enhance programs, it is important for them to be well commented and documented. This is especially true for long or complex programs. In BASIC, comments may be deleted from "execute" versions if necessary for speed and memory efficiency.

Here we will show you a method we at Sugar Software use to add emphasis to CoCo comments (REM statements) when they are printed on an Epson printer. The REMs are modified so that they print in the **wide** font.

Wide REMs are useful for the start of your subroutines. Other printers which have a double-wide font for additional emphasis may be used with this program with the proper modification.

The program described here scans the BASIC lines, looking for those which begin with REM or the apostrophe (another version of the REM which I call the comment). If the character following the REM or comment is a space, the space is replaced by a CHR$(14). In the Epson's character set, this is the signal to "begin enlongation." The remainder of the line will be printed in double-wide characters. At the end of the line, the Epson turns off enlongation without requiring any other control character.

If your printer does not behave this way (LP VII and VIII do not -- ed.), the required printer control character to turn off enlongation may have to be placed at the end of the REM statement or at the start of a following REM statement.

In order for this utility to be the most effective, it is written in three ways. All three programs do the same thing in the same way. If you are trying to get "into" Machine Language, I hope this format will help you understand some of the things which are being done.

The first program is written in BASIC and can be typed in at the end of your own BASIC program, executed and then deleted. The second is written in 6809 Assembly Language and does exactly the same thing. The BASIC version was written to be compared with the Assembly version. Variable names match with the registers used. Statements are simple so that they can correspond with the Assembly Language version.

There are a few reasons to choose the Assembly Language version. First, it is extremely fast -- almost instantaneous. Second, when you are ready to use it, you must only CLOADM and EXEC it. The Assembly version is position independent. This means that it can be loaded into any memory location and will execute without modification.

The version here is assembled at address Hex 0600, which is convenient for Extended BASIC since these programs generally exist at Hex C00 (PCLEAR 1) or higher.

For Color BASIC or Disk BASIC, Hex 0600 should not be used, so load at the high end of memory. To do this, protect the area using a CLEAR 200,k*1024-54. The 200 is for string space; use whatever you require. The "k" is the amount of memory you have (4, 16 or 32). The 54 is the number of bytes in the object code. The code can be POKEd into memory starting at k*1024-54. To CLOADM the object that was originally CSAVEMed at Hex 0600, issue a CLOADM "programname",(k*1024-54)-1536.

The algorithm the program uses locates the first statement of the BASIC program. Locations 25 and 26

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contain this address. The format of a BASIC statement is:

Bytes 0-1 - Address of the next statement (or zero if there are no more statements).
Bytes 2-3 - Statement number.
Bytes 4-n - Statement itself, ending in a zero byte.

After locating a statement, the program checks to see whether it is a REM or comment. A REM token is CHR$(130) in byte 4, a comment is a two-byte token, CHR$(58) followed by a CHR$(131) in bytes 4 and 5. If the following byte (5 if REM, 6 if comment) is a space, it is replaced by a CHR$(14), the Epson double-wide control code.

When the replacement is made, the statement number (bytes 2 and 3) is displayed. The next statement is then addressed and processing continues until a statement with a link field of zero is encountered. In both versions, X contains the address of the BASIC statement, A contains the statement token and B contains the offset from X to store the replacement byte. This value will be 5 for REM and 6 for comment. The D is used to contain the statement number to print.

This program employs three useful subroutines in the Color Basic ROM. They are:

Hex A928 - To clear the screen
Hex BDCC - Displays the decimal value in the D register
Hex B9AC - Displays a space

The final program is a BASIC loader to create the assembly (machine language) version. You can change the load point from Hex 0600 to some other if necessary. Another alternative is to "offset" load using the second operand of the CLOADM command as mentioned above. Don't forget to protect the area first with the CLEAR command when loading to high memory. After POKEing the program into memory with the loader, you can then save it with the Extended Basic CSAVEM command.

There are many modifications you could make to this program. One of the most practical -- especially for those who do not have a printer -- would be to replace the printer control code with one of the color graphic symbols (for example, a 255 for the orange rectangle). This would be useful when scrolling through a listing to find a "marked"

(Continued on Page 14)

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REMS (Cont'd from Pg. 13)

section or sections.

For your convenience, a tape is available from Sugar Software (2153 Leah Lane, Reynoldsburg, OH, 43068) for $7 containing: 1) A CLOADM image, 2) the BASIC program, 3) the BASIC loader and, 4) Assembly source.

The listings:

```
10 '  BIG CMNT
20 '
30 '       Gary A. Davis
40 '(C) 1981 By Sugar Software
50 '     2153 Leah Lane
60 ' Reynoldsburg, Oh.  43068
70 '
80 CLS
90 X=25
100 ' Main Loop
110 X=PEEK(X)*256+PEEK(X+1)
120 IF X<>0 GOTO 140
130 END
140 A=PEEK(X+4)
150 B=5
160 IF A=130 GOTO 220
170 IF A<>58 GOTO 110
180 A=PEEK(X+5)
190 IF A<>131 GOTO 110
200 B=B+1
210 ' REM Found
220 IF PEEK(B+X)<>32 GOTO 110
230 ' Replace
240 POKE B+X,14
250 D=PEEK(X+2)*256+PEEK(X+3)
260 PRINT D;
270 GOTO 110
```

```
10 '
20 '  BIG CMNT
30 '   LOADER
40 '
50 '       Gary A. Davis
60 '(C) 1982 By Sugar Software
100 LD=1536:'          Load=&H600
110 FOR X=LD TO LD+53:' For each
120    READ BYTE:'     Get a byte
130    POKE X,BYTE:'   Store byte
140 NEXT X
150 '
160 'Object code
170 '
180 DATA 189,169,40,142,0
190 DATA 25,174,0,38,1
200 DATA 57,166,4,198,5
210 DATA 129,130,39,11,129
220 DATA 58,38,239,166,5
230 DATA 129,131,38,233,92
240 DATA 166,133,129,32,38
250 DATA 226,134,14,167,133
260 DATA 236,2,52,16,189
270 DATA 189,204,189,185,172
280 DATA 53,16,32,208
```

```
*
*********************************
*                               *
*          BIG CMNT             *
*                               *
*        Gary A. Davis          *
*  (C) 1982 by Sugar Software   *
*                               *
*********************************
*
0600                    ORG   $600    Assem origin
0600                    *
0600 BDA928             JSR   $A928   Clear screen
0603 8E0019             LDX   #25     X->1st stmt
0606                    *   Main Loop
0606 AE00       LIN110  LDX   ,X      X->Next stmt
0608 2601               BNE   LIN140  Still more
060A 39                 RTS           End
060B                    *
060B A604       LIN140  LDA   4,X     Get token
060D C605               LDB   #5      B=Offset
060F 8182               CMPA  #130    Is it REM?
0611 270B               BEQ   LIN220  BR if yes
0613 813A               CMPA  #58     Is it ":"?
0615 26EF               BNE   LIN110  BR if no
0617 A605               LDA   5,X     A=Code
0619 8183               CMPA  #131    Is is "'"?
061B 26E9               BNE   LIN110  BR if no
061D 5C                 INCB          Offset+1
061E A685       LIN220  LDA   B,X     A=1st char
0620 8120               CMPA  #32     Is it space?
0622 26E2               BNE   LIN110  BR if no
0624 860E               LDA   #14     A=Strt wide
0626 A785               STA   B,X     Replace
0628 EC02               LDD   2,X     D=Line#
062A 3410               PSHS  X       Save X
062C BDBDCC             JSR   $BDCC   Print line#
062F BDB9AC             JSR   $B9AC   Print " "
0632 3510               PULS  X       Restore X
0634 20D0               BRA   LIN110  Continue
```

K-K-K-K-KILOBYTE

We've received a couple of letters and notes asking for information about the meaning of 4K (and 16K) program designations.

In short, some of you have asked whether you can run a 4K program on a 16K CoCo. The answer is "yes."

As far as program length is concerned, you can run any program which is LESS or EQUAL to the memory limit of your own Color Computer. All CoCo's can run 4K programs. Any CoCo with 16K can run programs 16K and below. A 32K machine will run any program which is 32K or smaller (even a 4K program).

CoCo must have Extended Color Basic to run Extended Basic programs, but an Extended machine CAN run plain old Color Basic as well as Extended.

Hope this helps.

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Construction...

BUILD A DESK FOR COCO

By Joseph E. Bennett

Here you are. You've spent a couple thousand dollars or so on your CoCo, disc drives, a line printer and a modem and set the whole thing up on the dining room table. Or, worse yet, you've got all this advanced gadgetry resting on a precarious perch with little room to spare.

Well, what CAN you do?

One solution is to go out and spend even more money for a custom desk for your equipment. But, if you are like me, you'd rather spend that money on more peripherals.

A solution to your problem may be to build the desk yourself. It isn't as difficult as you might think. The total cost should be less than $40, depending on how you choose to finish the top and legs.

If you're still with us, the first step is to gather the materials you need. The following list of tools is only a suggested minimum needed for the job:

* A crosscut hand saw or power jigsaw
* A flathead screwdriver
* A coarse wood rasp
* A drill and drill bits for screws

Plus, you will need these materials:

1 Small container Elmer's Glue
1 Box of #8x2 1/2" flathead slotted wood screws
4 #10x3/4" flathead slotted wood screws or nuts and bolts as needed for braces
1 Pack assorted grades of sandpaper
1 8'x4' sheet of 5/8" particle board
3 2x4's 66" long for bracing and support
4 2x4's 46 3/4" long for bracing and support
4 2x4's 30" long for legs
1 Quart Latex paint (optional if you wish another finish)
1 Can clear Acrylic laquer spray
1 2" (or larger) Paint brush
1 18" Angle braces

Now, here's how we make this beast...

STEP 1

Cut particle board to dimensions shown in figure 1. Be sure to follow the layout.

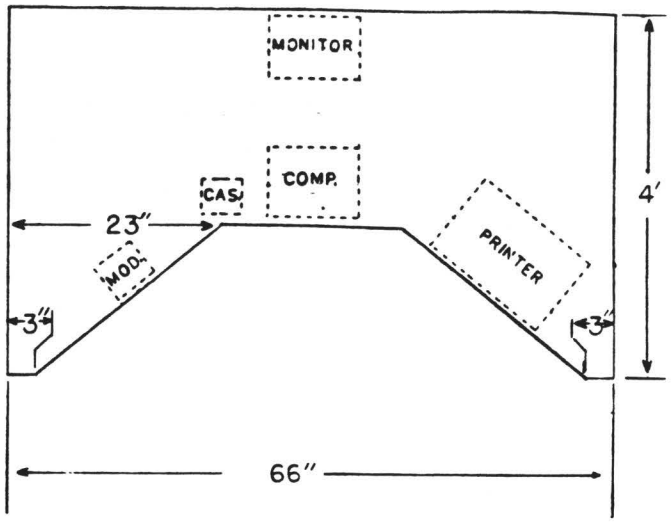

FIG.1

STEP 2

Construct frame and leg assembly by using two of the 66" long braces and the two 46 3/4 " long braces. Assemble into a rectangular frame, using drill to drill screw holes. Glue each joint (before assembly) for added strength. Refer to figure 2 for detail.

STEP 3

Mount four 30" legs to frame, as shown in figure 2, using glue and screws.

STEP 4

Mount 66" rear brace across rear legs at a height of 8" from bottom of legs, using screws and glue.

STEP 5

Mount two 46 3/4" side braces from rear legs to front legs at a height of 8" from bottom of legs using screws and glue.

STEP 6

Check for stability and let set for one hour if glue is used.

STEP 7

Place desk top on frame assembly so that rear of desk and rear of frame are flush and sides are even. Using screws, mount desk top to frame at 16 locations as per figure 2.

STEP 8

Mount angle braces beneath side wings of desktop. You will need to

bend the braces to fit flush on the desk top and legs. Use short screws or bolt to desk top.

STEP 9

Using sawdust and white glue, mix a paste and fill screwtops to flush with the surface. Let dry.

STEP 10

Using wood rasp, round edges and corners of desk top. Sand all surfaces smooth.

STEP 11

Paint with two coats Latex. Let dry between coats. When completely dry, spray top with clear Acrylic.

The desk dimensions can be altered to fit your own needs, as can your choice of finishes. A friend of mine went so far as to put a Formica top on his desk.

An added feature you might wish to consider is to mark all cable locations from your equipment and to cut holes in the desk. This will add a lot to a clutter-free top. You can even cut a paperfeed hole for the printer and store the paper below the desk.

Good luck with this project, and send any questions to me care of the RAINBOW.

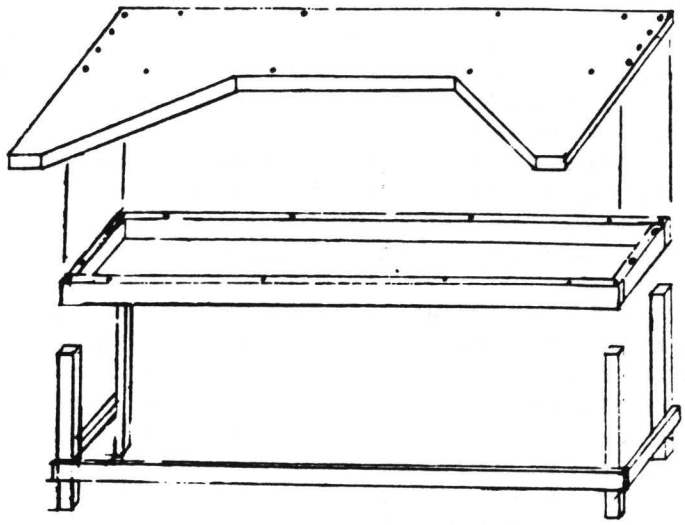

FIG. 2

CORRECTIONS

Programs listed in the RAINBOW are carefully checked for accuracy. Each program is run on CoCo before it is listed out to the printer, and then the program is immediately listed. We do this in an effort to be as certain as possible the program runs as described.

Some errors may creep in during the layout and printing process. We will correct any as soon as possible after they are called to our attention.

* * * * *

In DISC INDEX, exclamation points show up in lines 130, 242 and 365. The first "!" should be DSKI$, the second FREE and the third KILL.

Incidentally, somehow CoCo changed these commands to "!"'s while running the program, but before listing. The program ran correctly when the commands were substituted in running by the program.

If anyone knows how this might have happened, we would be interested in hearing about it.

In SNAIL INVADERS, Line 303, the end of the line should read "+GB$"

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Software Review...

COLOR DEMO TELLS 'EM WHAT COCO IS

How many times have you had some friend walk up to your favorite machine and ask you "just what DOES this thing do?"

Arnold Pouch of Superior Graphic Software (406 Little Mountain Road, Waynesville, NC, 28786, $24.95) has the answer. And, frankly, its quite a show.

TALKING GRAPHIC DEMO doesn't pl games nor does it perform any special helpful tasks (like balancing a checkbook). But, from its Wizard of Oz-like talking opening, it keeps everyone interested for 12 minutes while it explains just what the CoCo can do and how it works.

Anyone who has ever tried to show his CoCo off to a friend, neighbor, spouse or child has experienced the frustration of looking through tapes, CLOADing them, rewinding and the like. This one program allows you to sit back, relax and listen as CoCo starts off in a deep voice explaining..."I AM A COLOR COMPUTER!"

By the time its over, with random lines drawn, colors moving all over the screen and songs being played, you've done a good job of explaining it all. Without any work.

This is, frankly, better than anything the people who sell the machines have. Pouch says that your CoCo "deserves" this program.

We agree.

Software Review...

FLY THE GAUNTLET

GAUNTLET is a fast-moving arcade game in Machine Language which has a great deal of potential.

In fact, if you can overcome your initial disappointment in its block (low-res) graphics, it is a good game to play and a difficult game to win.

Available from Britt Monk, CDP (P.O. Box 802, Elyria, OH, 44036 for $10) GAUNTLET really does have a lot to offer.

You start out on one side of the Universe and have a given amount of time to penetrate as far as you can, zapping aliens and avoiding meteors as you go. Not only can you control

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Color Computer News

Are you tired of searching the latest magazine for articles about your new Color Computer? When was the last time you saw a great sounding program listing only to discover that it's for the Model I and it's too complex to translate? Do you feel that you are all alone in a sea of Z-80's? On finding on ad for a Color Computer program did you mail your hard earned cash only to receive a turkey because the magazine the ad appeared in doesn't review Color Computer Software? If you have any of these symptoms you're suffering from Color Computer Blues!

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where the ship will go horizonally on the screen, but you can also control how quickly it will move by using the joystick. The responses are made instantly, giving excellent control.

A readout at the bottom of the screen gives time left in the mission, amount of distance traveled and the score. You get points for zapping aliens and for transversing the screen. In other words, the faster you go, the more points you score. But as you go faster, it is more difficult to avoid the aliens and meteors. There's a score analysis at the end of each game.

Our main complaint is the low-res graphics. This could be a much better game were the space ship, aliens (which are kind of cute, if dangerous-looking), stars and meteors more finely detailed. Still, once you accept the graphics, GAUNTLET can be a challenging game to play.

Software Review...

BRICKOUT/WORD GUESS

BRICKOUT and WORD GUESS are offered on one cassette Twinpack by Rainbow Connection Software (3514 6th Place NW, Rochester, MN, 55901, for $11.95).

Both programs are written for the 4K CoCo and both are not only very fast but excellent examples of what can be done with limited memory.

WORD GUESS is a word guessing game which allows you to select the words that will be used. Author Wayne Diercks gives simple instructions on how to modify the program to include your own list of words.

Each letter is represented by a star, and you must guess the letters that make up the word. The computer fills in the letters you guess correctly in the proper place, and displays the incorrect letters at the top of the screen. The quicker you guess the right word, the higher your total score.

BRICKOUT is in the popular BREAK-AWAY tradition and, while in low-res as is necessary with 4K, gives all the necessary bells and whistles that make this game a good one. You can put "English" on the ball with the paddle, freeze action for a respite, decide when to "start" one of the balls and select both paddle size and speed of play. There is also an autopilot feature that will allow you to sit back and watch the game play itself.

BRICKOUT can be played with joysticks or from the keyboard.

As a special offer to RAINBOW subscribers, Diercks will make this (and all other twinpacks) available at a $2 discount. Merely mention RAINBOW when ordering.

WHEREZITAT???

Below, through the good offices of Bob Rosen of Connection-80 of Woodhaven, N.Y., are some start, end and execute addresses for several Machine Language programs.

These addresses can be used to relocate the Machine Language programs to other portions of the memory.

Say, for instance, you have a 32K system and want the M.L. programs "out of the way" of BASIC. By relocating the program, you free up a great deal of RAM for program use.

Generally speaking, you can add 16,000 to the addresses and they will relocate. This, however, is not always so...it depends on what area of RAM you end up in after the relocation. If your CoCo hangs up, try another address.

You cannot relocate M.L. programs without knowing the start, end and execute addresses, since they are a part of the command you need to use to save a M.L. program to tape.

The most simple procedure to relocate is to load the program in, but do not type EXEC. Then save the program back to tape, using the new addresses. However, you can also offset load these programs, and then save them back to tape with the new addresses -- which you can determine from this list by adding the offset. Programs shown are in the order necessary to the command: start address, end address and execute address.

VIDEOTEX &H1149, &H1988, &H1149

8-BIT DRIVER &H3F80, &H3FEA, &H3F80

SCREEN PRINT &H3080, &H3FF8, &H3600

MASTER CONTROL &H3600, &H3FFC, &H3600

CBUG &H0600, &HHDFF, &H0609

YOU AND YOUR TWO-TIMIN' CPU

By Wayne A. Diercks

Lately, a great deal of attention has been given to the double-speed command (POKE 65495,0) available with the CoCo. Little has been said, however, about how it works, its consequences and -- most importantly -- how to use it correctly.

First, an explaination of how double-speed works is in order. The CoCo was designed to run at a microprocessor (CPU) rate of 895 KHz (commonly called 1 Meg), which makes it an average speed personal computer. However, by simply typing POKE 65495,0 (or placing this as a command within a program), the CPU will run at double the clock rate (2 Meg) during most of its cycle. This effectively doubles the computer's speed. The command POKE 65494,0 will restore the clock rate to normal again.

This, then, brings us to the most important aspect of the double-speed command: How to use it in a program. One common method is to declare double-speed in the first line such as:

```
10 POKE 65495,0
```

Then, if double-speed will not work on your particular machine, simply delete the line and the program will operate at normal speed. This is, however, a much better way to make the program work as written on all computers with up to three user selectable speeds. This can best be shown by the following code, asking the user for the speed desired.

```
100 S1=65494:S2=S1:S3=S1:' SET ALL
    THREE SPEEDS TO NORMAL
110 INPUT "SPEED (1-3)"; SP: ' ASK
    USER TO SET SPEED DESIRED
120 IF SP>1 THEN S2=S1+S1: ' SET
    S2 TO DOUBLESPEED POKE ADDRESS
130 IF SP>2 THEN S3=S1+1: ' SET
    S3 TO POKE DOUBLESPEED POKE
ADDRESS IF 3 IS SELECTED
```

You now have speed 1, 2 and 3 represented in the form of normal and double-speed address locations. Now in the high-speed mode subroutine or portion of your program, insert the command:

POKE S1,0 - Before all sound commands and before leaving the subroutine or high speed part of the program. This slows down to normal speed no matter what speed is selected.

POKE S2,0 - At the beginning of the subroutine or high speed part of the program and after all sound, keyboard and joystick reads in order to speed up for calculations, comparisons and screen prints if speed 2 or 3 was selected.

POKE S3,0 - Before all keyboard and joystick reads so they are read at double-speed only when speed 3 was selected.

This is THE most efficient way of doing the most double-speed on all machines and should become the standard of double-speed programming for CoCo.

So, you may ask, "Why not always run at double speed?" As always, there are complications to overcome. Most early models (serial numbers below 20,000) contained slower MC6809E microprocessors and 6821 peripheral interface adaptors (PIAs). These will rarely run reliably (if at all) at double-speed. Later models

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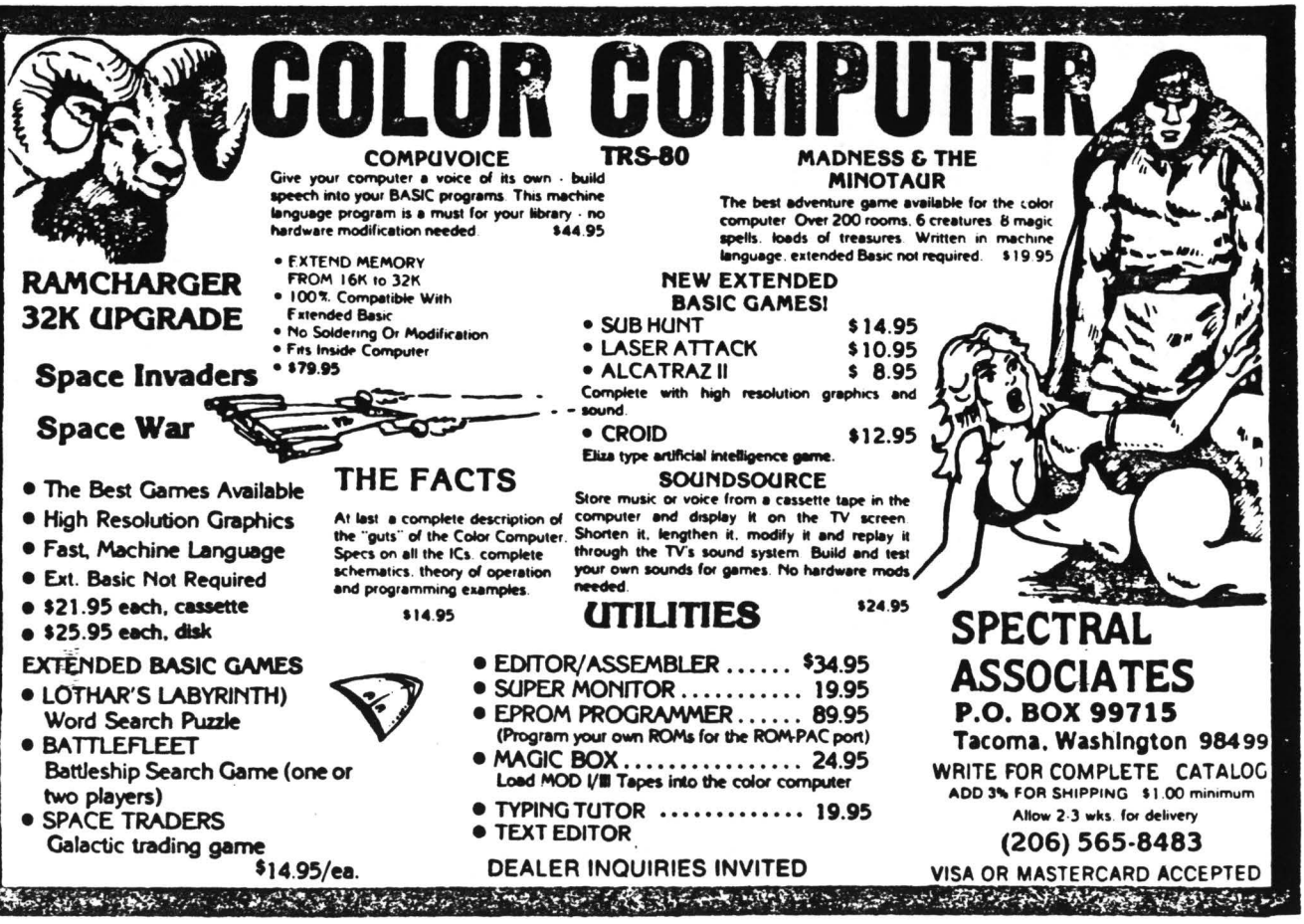
Although most of the slower CPUs will run most of the time at the faster rate, they will occasionally "lock up" that requires a reset. They may also dump the program. We recommend you save your program to tape frequently when running double-speed.

The PIA chips are used in all Input/Output operations except for screen display. Hence, the slower PIAs will not work reliably on any operation involving the cassette, RS232 (printer, modem), expansion (program packs, disc drives), joystick or keyboard ports and all sound to the speaker. Although they may function intermittantly at double-speed while reading the keyboard or joystick, they nearly always "bomb" in the other operations.

Fortunately, there is little need for double-speed sound and it is best to avoid them altogether. However, just the mere presence of the disc controller in the expansion slot (even when idle) will automatically execute a read of this port, restricting the use of double-speed on disc software.

It is also worth noting that each time a speed change is executed, the computer POKEs an 88 into address 135. This is the address read by the INKEY$ command to determine the last key pressed and it will return an "X" upon its next appearance in the program.

Employing the double-speed technique along with other memory- and time-saving aids enabled us to make Rainbow Connection Software's three-speed BRICKOUT game, written entirely in 4K Color BASIC, one of the fastest and most complete available. It is but another tribute to the power and advanced design of the amazing CoCo.



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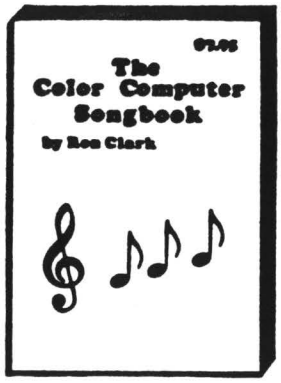

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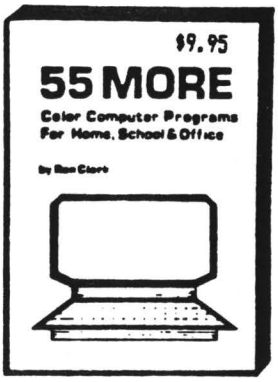

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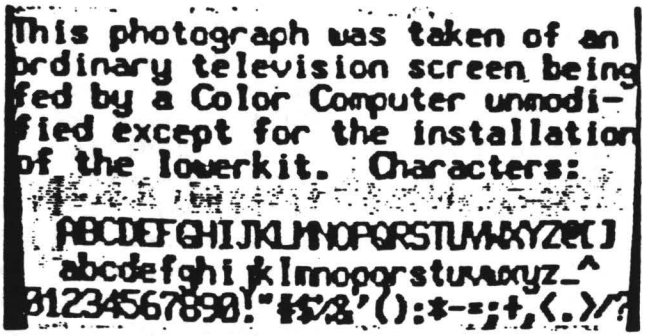

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Tutorial...

MOTION PICTURE PROGRAMMING (MPP)

A completely new method for programming superior graphic programs has come from the mountains of North Carolina.

It may well be the best thing to come out of the hills since moonshine, because Motion Picture Programming (MPP) -- as developed by Arnold Pouch of Superior Graphic Software -- does away with the long tedious hours we all know are required to produce detailed graphic pictures from a program using the standard commands such as DRAW, LINE, CIRCLE, COLOR, SCREEN, PSET, PCLS, PAINT and the like.

Seldom will any of these commands be found in a program developed by the new MPP method. Instead, MPP uses a new way to divide the graphic programming process into three distinct operations.

The first operation uses a modified "drawer" program from CHROMASETTE's August, 1981, issue to produce a graphic picture. If you don't already subscribe, single issue cassette tapes are $5 from CHROMASETTE (P.O. Box 1087, Santa Barbara, CA, 93102).

The "drawer" will take a little practice before you become skilled in its use. But soon, you will be able to produce graphics in as much detail as you want. And, if you have any artistic talents, the results can be very satisfying.

When your graphic picture is drawn to your satisfaction, your picture will be in memory locations 1536 through 7679 (or graphic pages 1-4). Still using your "drawer," you now switch to graphics page five, or five and six combined on a 16K machine (up to page eight if you have 32K). It is on these pages that you draw what are termed graphic motion modifiers, such as moving parts for your picture, graphic letters and numbers, flashing lights, moving hands -- anything that your imagination can come up with that you will want to use later to enhance your graphic picture and give it motion.

As an example, suppose you wished to draw a face, and have one eye blink. You would draw the face with the eye fully open on pages 1-4 and then go to page 5 and draw a series of eyes, the first with the lid a quarter way shut, the second with the lid half shut, the third with the lid three-quarters shut and the fourth with it fully shut. These additional "eyes" are graphic motion modifiers, and you can call them to the main screen as you wish through GETs and PUTs in your BASIC program.

In addition, you can "pack" as many graphic motion modifiers as you wish on a page. Merely by referencing their coordinates (an easy process with CHROMASETTE's "drawer" program) you can do all sorts of animation.

Using CHROMASETTE's "drawer," you find the X-Y locations of each item on your screen and make a list of where to GET them and where to PUT them when your program calls for it.

You still have not written a program, but all of your detailed graphic work is finished -- and it was fun doing it.

Before we leave step one, you will need to CSAVEM "picture", 1536,

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Special Software Preview...

SPECTACULATOR IS SPECTACULAR

A game machine with VisiCalc? Of course not. But, as we've been saying for a long time now, the Color Computer is much more than a game machine.

There is something about the number-crunching ability of VisiCalc that seems to separate the Computer grownups from the Computer kids. And, while SPECTACULATOR (soon to be available for $39.95 at all Radio Shack stores and dealers) isn't quite VisiCalc, its an excellent version of the original "electronic spreadsheet" program that will do wonders for your budgeting and forecasting needs.

Tandy's SPECTACULATOR comes in a handsome package and includes a ROM Pak and a 43-page instruction manual. The manual is excellent and shows how to set things up, what equipment you will need, how to make SPECTACULATOR strut its stuff and gives two levels of "sample sessions" that make practical use of all the features. There is also a summary for reference.

For those who have seen or used VisiCalc, the one thing that is seen to be missing right away is the slash (/) command. Rather, SPECTACULATOR uses two-letter commands to enter in all the directions. Since we're familiar with VisiCalc, it took about 10 minutes to get used to the command structure. From there on, we think it was easier to use (and remember) than its older brother.

SPECTACULATOR is designed to do anything that may need to handle or compare numbers. It sets up a "spreadsheet," like those an accountant uses, and will carry that sheet out 99 columns by 99 rows. Most important, you can set up formulas for each position -- referencing it by its column and row designation -- and then have SPECTACULATOR calculate the relative value if you only give it a starting set of values.

SPECTACULATOR's method of operation is a little different than is VisiCalc, but it accomplishes much of the same thing. One of the things we particularly like is that it lets you tell it when to calculate. VisiCalc just does its calculations -- sometimes before you really want it to.

There is also a sophisticated HELP system available for all the commands so that, while the documentation is excellent, you do not have to page through the manual looking for the exact syntax for this or that.

There is full screen cursor control and a number of excellent features such as delete and insert rows and columns, save on tape, list to printer and display free memory. You can even change the size of a "window" -- to accomodate larger numbers. Alphanumeric labels can be entered, too.

All in all, we are very impressed with SPECTACULATOR. Its a winner!

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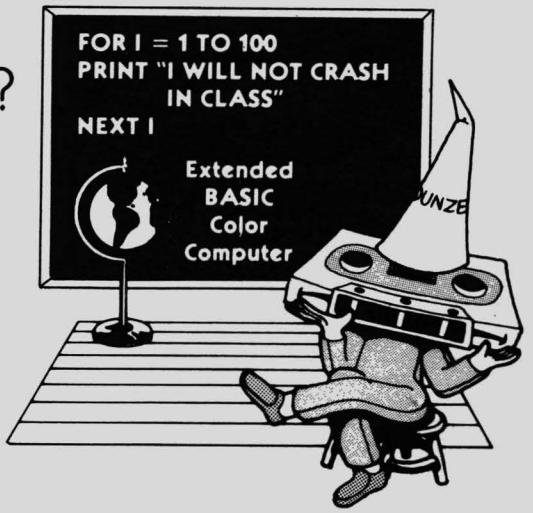

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